



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification: <b>A61F 2/44</b>	<b>A3</b>	(11) International Publication Number: <b>WO 00/41655</b>
		(43) International Publication Date: <b>20 July 2000 (20.07.2000)</b>
(21) International Application Number: <b>PCT/US00/00604</b>		<b>Published</b>
(22) International Filing Date: <b>11 January 2000 (11.01.2000)</b>		
(30) Priority Data: <b>60/115,388 11 January 1999 (11.01.1999) US</b>		
(60) Parent Application or Grant SDGI HOLDINGS, INC. [/]; O. BOYD, Lawrence, M. [/]; O. BURKUS, J., Kenneth [/]; O. DORCHAK, John, D. [/]; O. BOYD, Lawrence, M. [/]; O. BURKUS, J., Kenneth [/]; O. DORCHAK, John, D. [/]; O. GANDY, Kenneth, A. ; O.		

(54) Title: INTERVERTEBRAL SPACERS WITH SIDE WALL ACCESSIBLE INTERIOR CAVITY

(54) Titre: ESPACEURS INTERVERTEBRAUX A CAVITE INTERIEURE ACCESSIBLE PAR UNE PAROI LATERALE

## (57) Abstract

Intervertebral spacers, tools for implanting intervertebral spacers and methods of promoting fusion bone growth in the space between adjacent vertebrae are provided. The spacers include an elongated body having a first end, a second end and an outer surface. Side walls connect the first and second ends. The elongated body also defines an interior cavity. The side wall defines an opening to the interior cavity in a side of the elongated body. At least one of the first and second ends has a discontinuity, such as a concave surface, for nesting with an adjacent spacer. The tools include spacer engaging means for engaging a spacer and occlusion means for blocking an opening defined in the spacer. In some embodiments, the occlusion means includes a plate extendible from the housing. In one specific embodiment the plate defines a groove which is disposed around a fastener attached to the housing so that the plate is slideable relative to the housing. The methods of promoting fusion bone growth include utilizing the inventive spacers described herein.

## (57) Abrégé

L'invention concerne des espaceurs intervertébraux, des outils permettant d'installer ces espaceurs, et des techniques favorisant la croissance osseuse par fusionnement dans l'espace situé entre des vertèbres adjacentes. Ces espaceurs comprennent un corps allongé possédant une première extrémité, une seconde extrémité, et une surface extérieure. Les parois latérales relient les première et seconde extrémités. Le corps allongé définit également une cavité intérieure. Lesdites parois latérales définissent une ouverture vers la cavité intérieure, sur un côté du corps allongé. Au moins l'une des première et seconde extrémité présente une discontinuité, telle qu'une surface convexe, destinée à s'emboîter dans un espaceur adjacent. Les outils comprennent un organe d'engagement d'espaceur qui permet d'engager ledit espaceur, et un organe d'occlusion qui bloque une ouverture définie dans l'espaceur. Selon certains modes de réalisation, l'organe d'occlusion comprend une plaque extensible à partir du logement. Selon un mode de réalisation spécifique, la plaque définit une rainure entourant un système de fixation fixé au logement, de sorte que ladite plaque peut coulisser par rapport à ce dernier. Les techniques favorisant la croissance osseuse par fusionnement consistent à utiliser les espaceurs de cette invention.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 July 2000 (20.07.2000)

PCT

(10) International Publication Number  
**WO 00/41655 A3**

(51) International Patent Classification<sup>1</sup>: A61F 2/44

(21) International Application Number: PCT/US00/00604

(22) International Filing Date: 11 January 2000 (11.01.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/115,388 11 January 1999 (11.01.1999) US

(71) Applicant (for all designated States except US): SDGI HOLDINGS, INC. [US/US]; Suite 508, 300 Delaware Avenue, Wilmington, DE 19801 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): BOYD, Lawrence, M. [US/US]; 688 S. McLean Boulevard, Memphis, TN

(74) Agents: GANDY, Kenneth, A. et al.; Woodard, Emhardt, Naughton, Moriarty & McNett, Bank One Center/Tower, Suite 3700, 111 Monument Circle, Indianapolis, IN 46204 (US).

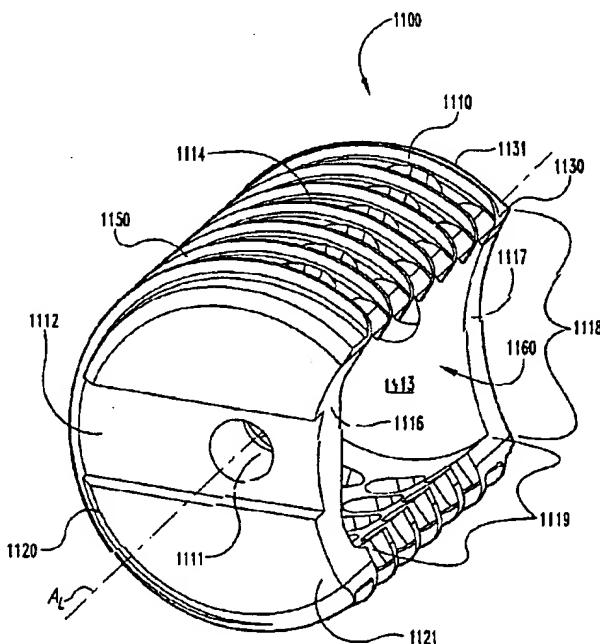
(81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent

[Continued on next page]

(54) Title: INTERVERTEBRAL SPACERS WITH SIDE WALL ACCESSIBLE INTERIOR CAVITY

WO 00/41655 A3



(57) Abstract: Intervertebral spacers, tools for implanting intervertebral spacers and methods of promoting fusion bone growth in the space between adjacent vertebrae are provided. The spacers include an elongated body having a first end, a second end and an outer surface. Side walls connect the first and second ends. The elongated body also defines an interior cavity. The side wall defines an opening to the interior cavity in a side of the elongated body. At least one of the first and second ends has a discontinuity, such as a concave surface, for nesting with an adjacent spacer. The tools include spacer engaging means for engaging a spacer and occlusion means for blocking an opening defined in the spacer. In some embodiments, the occlusion means includes a plate extendible from the housing. In one specific embodiment the plate defines a groove which is disposed around a fastener attached to the housing so that the plate is slideable relative to the housing. The methods of promoting fusion bone growth include utilizing the inventive spacers described herein.

WO 00/41655 A3



(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
7 December 2000

**Published:**

- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

In International Application No  
PCT/US 00/00604

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61F2/44

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (names of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 593 409 A (MICHELSON GARY K) 14 January 1997 (1997-01-14)  figures 41-43,25,30 column 12, line 55 -column 13, line 22 column 15, line 12 - line 29 claims 1-18	1,3-20, 22-37, 52-57
Y	---	2,21
Y	US 5 645 598 A (BROSNAHAN III ROBERT E) 8 July 1997 (1997-07-08) figures 4,14 column 3, line 39 -column 5, line 61 ---	2,21
		-/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*&\* document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

25 September 2000

03.10.2001

Name and mailing address of the ISA

Authorized officer

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Fax. 31 651 epo n,  
Fax: (+31-70) 340-3016

Mary, C

4

Form PCT/ISA/215 (second sheet) (July 1992)

## INTERNATIONAL SEARCH REPORT

Int'l Application No.  
PCT/US 00/00604

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 17209 A (HOECK JAMES E VAN ;SDGI HOLDINGS INC (US); BOYD LAWRENCE M (US); M) 30 April 1998 (1998-04-30) figures 3-8,47-49 page 14, line 11 -page 16, line 4 page 28, line 24 -page 29, line 26 ---	1-37, 52-57
A	EP 0 302 719 A (SHOWELL A W SUGICRAFT LTD) 8 February 1989 (1989-02-08) column 2, line 19 - line 52 figures 1-6 ---	1,19,20, 34,52,53
A	US 4 736 738 A (GLOBEVNIK JOZE ET AL) 12 April 1988 (1988-04-12) figures 12-29 column 4, line 8 - line 36 ---	38,39
A	US 5 423 825 A (LEVINE ANDREW S) 13 June 1995 (1995-06-13) figures 1-17 column 6, line 47 -column 8, line 50 -----	38,39

**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/US 00/08604**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: **40-51**  
because they relate to subject matter not required to be searched by this Authority, namely:  
**Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery**
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest** The additional search fees were accompanied by the applicant's protest. No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-37,52-57

An interbody fusion spacer.

2. Claims: 38-39

A spacer insertion tool.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

In *International Application No.*  
**PCT/US 00/00604**

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 5593409 A	14-01-1997	US 5741253 A US 5015247 A AU 716409 B AU 4445196 A CA 2168835 A CN 1134810 A EP 0732093 A JP 8266563 A TR 960846 A US 5785710 A US 6080155 A US 5505732 A US 5797909 A US 6096038 A US 5484437 A US 5772661 A AT 169811 T AU 3838789 A CA 1332999 A DE 68928790 D DE 68928790 T EP 0419564 A EP 0712607 A WO 8912431 A		21-04-1998 14-05-1991 24-02-2000 29-08-1996 30-04-1994 06-11-1996 18-09-1996 15-10-1996 21-10-1996 28-07-1998 27-06-2000 09-04-1996 25-08-1998 01-08-2000 16-01-1996 30-06-1998 15-09-1998 12-01-1990 15-11-1994 24-09-1998 25-03-1999 03-04-1991 22-05-1996 28-12-1989
US 5645598 A	08-07-1997	US 5766253 A AU 1748297 A WO 9725946 A US 6102948 A		16-06-1998 11-08-1997 24-07-1997 15-08-2000
WO 9817209 A	30-04-1998	AU 4994697 A EP 0955961 A JP 2000507484 T US 5989289 A US 5888222 A		15-05-1998 17-11-1999 20-06-2000 23-11-1999 30-03-1999
EP 0302719 A	08-02-1989	AT 67395 T DE 3864946 A GB 2207607 A,B GR 3002859 T JP 1303148 A JP 2114682 C JP 8022294 B US 4904261 A		15-10-1991 24-10-1991 08-02-1989 25-01-1993 07-12-1989 06-12-1996 06-03-1996 27-02-1990
US 4736738 A	12-04-1988	NONE		
US 5423825 A	13-06-1995	AU 4597793 A WO 9325150 A		04-01-1994 23-12-1993